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to the absolutely pure substance, or to some numerical value (atomic weight and the like), in the same way the machine builder strives for the conveyance of energy with the least possible loss, and the engineer for the lightest possible carrier.

And if indeed, the complete solution of these problems lies beyond the scope of our powers, if from the side of nature the inexorable 'No' stands against us; nevertheless, we have in our hands in the increasing accuracy of our methods of work the true philosopher's stone, by means of which we can ever come nearer and nearer to our goal. Let us look upon the creation of new methods of experimentation and the improvement of the old methods in our practical science, as one of the most important duties for those who seek for progress and see in the development of our powers of reason the foremost task of the cultured mind.

FRIEDRICH EMICH.

GRAZ, HUNGARY.

CORRESPONDENCE OF C. S. RAFINESQUE AND
PROFESSOR WM. WAGNER.

IN hunting through the natural history material collected by the late Professor William Wagner in the Wagner Free Institute of Science, some fourteen years ago, I discovered several letters from the eccentric naturalist Rafinesque, together with a number of pamphlets written by him.

Professor Wagner had evidently taken up Rafinesque upon his return to Philadelphia from Kentucky with all the enthusiasm that a man interested in the development of the study of natural history must have for one who gave his whole time and all the money he could scrape together for the amassing of collections in every department of zoology and botany. It would appear from the context that Rafinesque had got into trouble (no unusual thing for him) and wished Professor Wagner to go

on his note for the amount necessary to relieve him. This was promptly refused for the reasons given in Professor Wagner's letter, and Rafinesque writes to him on the 10th of April, 1840, as follows:

DEAR SIR:—I wish you will send me five dollars at y'r convenience for my 'Amenities of Nature' or at least One Dollar for the first Number that you have already had—that is the price. The value of Montford is \$10. having 261 plates & with my notes \$12. to 15; while Mantell is only worth \$3.

I sell my works, my shells, my drawings and my services—I give them away sometimes to particular friends only, altho' I can hardly afford it.

Yours, &c,

C. S. RAFINESQUE.

Professor Wagner immediately replied on the 10th of April, 1840:

DEAR SIR:—Your note of this morning I found on my table on my return home at noon.

Your singular request to send you five dollars "at my convenience for your 'Amenities of Nature,' or one dollar for the one you say I have rec'd really surprises me. I now return to you unread, as my time has been otherwise much occupied that which you loaned me for my perusal and to which I never subscribed. If you have done perusing my copy of Mantell which, you informed me, you had read with interest & pleasure, you will please hand it to the bearer, as I wish to lend it to other of my friends. You inform me you sell your works, shells, drawings & services. I would beg leave to remark I have no occasion for any of them at present. You add "you give them away sometimes to particular friends only." I would add if you intend the remark for me you must know I never asked you for anything, neither have I ever received an atom of any of your property or effects, no not the most trifling, neither do I want them. I really regret my refusal yesterday to enter the requested security has produced an ebullition of feeling as your note indicates. I would have thought that your age and philosophy would have controlled your passions particularly after my explaining my reasons.

Yours, &c,

WM. WAGNER.

The reply from Rafinesque is dated April 12, 1840, and reads as follows:

MR. WILLIAM WAGNER.—The work of Mantell was delivered to your servant as you requested. I am used to disappointments—it was not an angry feeling but *sorrow* I experienced at your refusal;

sorrow that I had been mistaken in hoping I had acquired another learned friend. I had anticipated much pleasure from the study with you of the shells and fossils of y'r fine cabinet, as you tendered—you may now have that pleasure alone. I wish Conrad, Troost and others may be found willing to give you for nothing the use of their labors and discoveries, as I had proposed for my own; but I doubt it; Few are as liberal as I am. As you neither require my works, nor shells, nor fossils, nor labors *now*, I have wondered why you asked them before.

My time will thus be better employed perhaps in continuing my solitary labors. It is a pity that here naturalists will not be friends and labor jointly to increase knowledge. When you return from your intended travels we may resume joint studies, if you require it.

Respectfully yours,

C. S. RAFINESQUE.

On the 16th Professor Wagner writes :

Your note of the 12th was handed me this morning only. You still harp upon the disappointment you reced in my refusal to enter bail as you stated for your appearance only to prosecute an appeal which in reality was bail for debt, squire fees, court expenses, etc., in case of final defeat. If your boisterous manner and final departure without an ordinary adieu expresses sorrow (& what I considered anger) why you show your feelings very differently from anyone I ever saw. I expressly informed you I was retiring from business and this day we have advertised our stock for sale at auction and I have resolved that I would not contract any new liabilities, that I was closing everything and would avoid all new responsibilities. Any reasonable man would not have murmured at such an explanation. My article of co-partnership independently of all other objections positively precludes my complying with your request. I regret that you should have thrown the obstruction in the way of our scientific intercourse and assure you that I was as much pleased with our friendly interchange of thoughts and opinions as you could possibly have been. You have caused the breach. Therefore it is for you to close it if you desire it. You again speak of giving for nothing your labor, your discoveries, etc. I never received any of your labors, or discoveries, or anything else. If you can show I have, send me a bill of it and I will pay your demands. The only transaction we have had was that I loaned you a book and you loaned me one. I cordially agree with you that any interruption of our joint studies by your extraordinary request is as disagreeable to me as it can be to you.

Respectfully yours,

The last letter comes from Rafinesque under date of the 17th of April, 1840.

SIR:—Y'r letter of yesterday did not require immediate answer, but having received two important letters from European geologists which under other circumstances would have been immediately shown to you, it may be proper to impart some of their contents. My Geological Fragments have been published by the first Geological Society of Europe. I am informed that American fossils (particularly of the oldest formations) are very scarce in European collections and wanted for sale and exchange. I am instructed to apply to you and others for specimens but all of mine are required. Muchinson (?) and a friend of mine are going to publish jointly the whole silurian system of Europe and all such American fossils of that age they can procure, therefore as you have stated you no longer want my fossils and have perhaps given up y'r idea of undertaking the American silurian system—I propose to send to Europe this year the whole of my American fossils amounting to thousands and of great value—of which it is proper you should be apprized in time. If you should go to Europe instead of the South and West and carry your fossils there, I will be able to inform you further. I shall no longer *harp* as you say on my disappointment I have merely to remark that as a candid man I prefer a direct refusal to pretext. That you may be undeceived ab't your apparent surmise, I must add that I don't owe one dollar to anybody, and pay all just demands. It was never stated that you received any of my labors and I don't send false bills to anyone. My herbarium was all around us at my office and you never asked to peep into it. My fossils and shells are in boxes as I cannot spend large sums like you to display them. They have been tendered for drawings only at y'r own request, a great favor you ought to know; but next year shall be in Europe where valued and paid for in the equivalents. As I have many duplicates if you will exchange them immediately with some of y'r's I have no objection—Price for price.

Respectfully y'r's,

C. F. RAFINESQUE.

These letters would seem to be almost childish but for the fact that Rafinesque had been for several years thoroughly eccentric in his actions and this was probably the beginning of the miserable end.

They were probably written when he lived on Race Street in a garret. If he died on September 18, 1840, as is stated by R. E.

Call in his 'Life and Writings of Rafinesque' these must have been written but five months before his decease and his quarrel with Professor Wagner probably ended his scientific associations in this City.

In looking up the date of his death I have been struck with the fact that Lippincott's Biographical Dictionary, Simpson's 'Lives of Eminent Philadelphians' and Appleton's Cyclopedia of American Biography quote the date of his death as September 18, 1842 and the National Cyclopedia of American Biography is the only authority that I can find for the year 1840, which is used by Call.

THOMAS L. MONTGOMERY.

WAGNER FREE INSTITUTE OF SCIENCE,
March 2, 1900.

*SOME OBSERVATIONS CONCERNING SPECIES AND SUBSPECIES.**

SOME few weeks ago I gave to this Society a brief general account of the investigations which the Fish Commission carried on at Lake Maxinkuckee during the past summer and fall.

At this time, I desire to speak briefly concerning two new fishes obtained in these investigations, and certain questions concerning species and subspecies which their study has suggested.

In the first place, permit me to repeat some of the statements regarding the lake and its small tributary streams.

Lake Maxinkuckee is located in the southwest corner of Marshall County, Indiana, on the Logansport and Terre Haute railroad, 32 miles north of Logansport, or 34 miles south of South Bend, Indiana. It is about 2.75 miles long, from north to south, 1.75 miles wide, and is quite regular in outline. This, like all the lakes of northern Indiana, is of glacial origin. Its greatest depth, so far as known, is 86 feet. The bottom is of

compact sand and gravel near the shore, then a wide bed of marl, and soft mud in the deeper parts. There are only 1 or 2 short reaches near the shore where the bottom is soft. The water is relatively pure and clear. The bottom temperature in summer is 47° to 50° Fahr., while the surface gets as warm as 77° to 80°.

The lake is well supplied with aquatic vegetation; *Chara*, *Potamogeton*, *Myriophyllum*, *Ceratophyllum*, *Nitella*, *Vallisneria* and *Scirpus* being abundant. At least ten species of *Potamogeton* occur and two species of *Scirpus* are found. *Chara* is very abundant, great beds of it covering the bottom in many places from near shore out to a depth of 12 or 15 feet.

The catchment basin of the lake is small. There are no tributary streams except one very small brook at the south end, a somewhat larger one at the southeast corner, and three small ones upon the east and northeast sides. The total amount of inflow from these little creeks is but a few gallons per minute. They are all short, sluggish streams and do not vary greatly in size at any time. Perhaps the only ones deserving mention are (1) the one at the southeast corner which is popularly known as 'the inlet,' (2) one near the middle of the east side, and (3) one at the northeast corner flowing into Culver Bay, and which has come to be known as Culver Inlet. The stream on the east side has been called Aubeenaubee Creek, from the Pottowatomie chief of that name who at one time owned the land on the east of the lake. It was from this small creek that the specimens of the new species were obtained. Aubeenaubee Creek does not exceed 1.5 miles in length. It has its source in a small marsh, and is a sluggish stream flowing through a low, level meadow or prairie region. It is about 4 feet wide and averages only 3 to 6 inches deep, with deeper holes at intervals. Through most of its

* Read before the Washington Biological Society, Jan. 26, 1900.